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(71) Applicant *(for all designated States except US)*: SONERA OYJ [FI/FI]; Teollisuuskatu 15, FIN-00510 Helsinki (FI).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: JALKANEN, Tero [FI/FI]; Simo Klemetinpojan tie 4 A 17, FIN-00710 Helsinki (FI).

(74) Agent: KOLSTER OY AB; Iso Roobertinkatu 23, P.O.Box 148, FIN-00121 Helsinki (FI).

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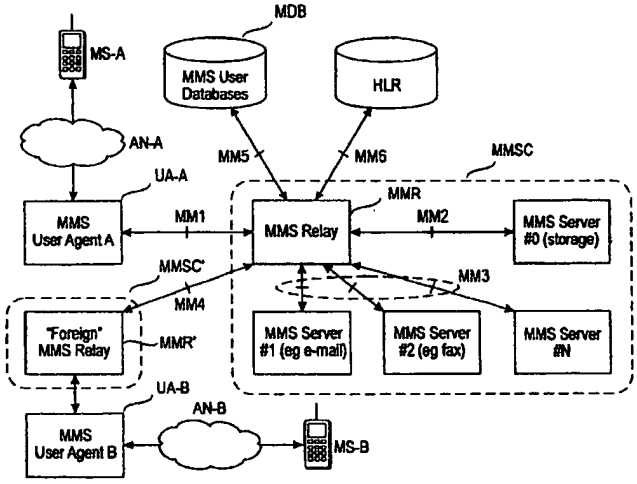
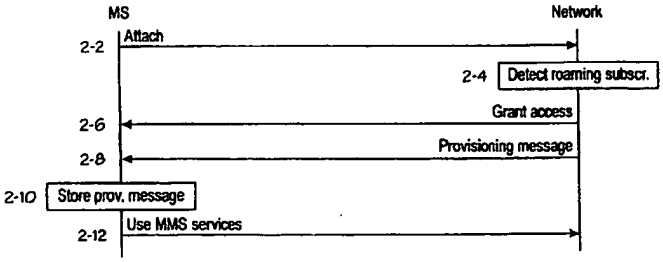
(54) Title: ROAMING IN MMS ENVIRONMENT





(57) Abstract: A method for providing MMS services for a terminal roaming in a visited network. The terminal (MS) transmits an attach request (2-2) to the network and, in response to the attach request, the network provides the terminal with network services (2-8). In order for the roaming subscriber to be able to use the services of the visited network, the network sends the terminal (MS) a provi-sioning message (2-8) including sufficient information for using the MMS services, and the terminal utilizes the information included in the provisioning message for using the MMS services (2-12).

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Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

ROAMING IN MMS ENVIRONMENT

BACKGROUND OF THE INVENTION

The invention relates to supporting subscriber roaming in an MMS (Multimedia Messaging Service) environment in particular. An MMS is a 3GPP (Third Generation Partnership Project, cf. www.3gpp.org) specification group for third generation mobile communication services.

Figure 1 shows a reference architecture specified by the 3GPP. An essential element is an MMSC (Multimedia Messaging Service Centre) MMSC. According to the reference architecture, the multimedia messaging service centre MMSC includes an MMR (MMS Relay) and a number of servers. According to the established naming practice, server 0 is a storage server while other servers 1 to N provide other services, such as e-mail, telefax services etc. The MMS relay MMR is connected to two databases, i.e. subscriber registers: a subscriber database MDB of the MMS and an HLR (Home Location Register). A first terminal (mobile station) MS-A, the information on whose subscriber has been stored in the subscriber registers of the particular MMSC, is connected to the MMSC through an access network AN-A and a first user agent UA-A. A mobile station MS-B located in a visited network is connected to the MMSC through corresponding elements AN-B, UA-B and MMR' in the visited network.

A problem with the above-described system is that the MMS specifications do not adequately take into account the need for supporting a roaming subscriber. In a visited network, e.g. while abroad, a need may arise to be able to utilize the services of a local operator, such as a map of restaurants or timetables for public transport. These services are, however, often allowed to the clients of a local operator exclusively, i.e. to users who have access to the network of the particular operator. In other words, roaming users cannot use such services and operators cannot charge the roaming users for using the services, either.

BRIEF DESCRIPTION OF THE INVENTION

An object of the invention is thus to provide a technique for solving the problem mentioned above. The object of the invention is achieved by a method and a system which are characterized by what is disclosed in the independent claims. Preferred embodiments of the invention are disclosed in the dependent claims.

The idea underlying the invention is that a subscriber roaming in a visited network receives an MMS services provisioning message from an operator of the visited network (a roaming operator). The provisioning message includes provisioning information, i.e. information necessary in order for the MMS terminal to be able to contact the network of the roaming operator and to use the services therein. Typically, such provisioning information includes:

- MMSC address
- GPRS APN (access point name)
- WAP GW address
- user identifier
- password
- data mode (connection-oriented/connectionless)
- security level (open/secured).

Ordinarily, a terminal asks a user to make sure that the provisioning information becomes stored on the device. Depending on the implementation of the terminal, a message may also be stored automatically on the terminal. Next, the user may use the MMS services of the roaming network. When the user returns to the home network, provisioning takes place again in accordance with the settings of the home network.

An advantage of the invention is that the services are also available to a roaming subscriber while no external signalling (e.g. separate service layer gateways) is necessary since traffic in its entirety takes place in the network of the roaming operator. The invention requires no great changes to the MMS infrastructure.

According to a preferred embodiment of the invention, a provisioning message is transmitted in a roaming situation to a terminal in response to the user of the terminal calling a certain number reserved for transmitting the provisioning message. Instead of making a call, the user of the terminal may transmit an SMS, EMS or MMS message to a certain number or address. According to a third alternative, the user may activate a service from a WAP/WWW page. According to still another alternative embodiment, the network detects a new roaming subscriber and, according to a contract between operators, consults the user's home network in order to find out whether or not the subscriber is a subscriber to the MMS provisioning service.

Depending on the implementation, the roaming user has to be added to the user database of the MMSC of the visited network in order to allow access to the MMSC. This can be automated e.g. by allowing access to the MMSC to all and, after the first access, the particular user is automatically added to the user database. Correspondingly, it may also be justified to remove the user automatically from the user database of the MMSC of the visited network. This is to say that the user information can be removed automatically in order to clear some space in the database e.g. if the particular user has not used this MMSC (or has not been a roaming client in the particular network) during a given time, e.g. during the last six months.

In order for the roaming user to know what services are available, an MMS message may be sent to him or her as a push message listing the MMS services provided by the visited network as soon as the user has been provisioned. Alternatively, a list of the MMS services being provided can be given even before provisioning the user, which motivates the user to allow the provisioning of his or her telephone in the visited network.

The invention enables MMS services to be used even when a roaming operator and a home operator do not have a valid roaming contract. Ordinarily, the user's MMS mobile telephone would be completely useless, but it is now possible to use at least the local services. In addition, if a valid MMS interworking contract exists between the roaming operator and the home operator, it is in principle possible to send MMS messages home therethrough even if roaming does not work in an ordinary manner.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is now described in closer detail in connection with the preferred embodiments and with reference to the accompanying drawings, in which

Figure 1 shows a reference architecture specified by 3GPP, and

Figure 2 is a signalling diagram illustrating the operation of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Figure 2 is a signalling diagram illustrating the operation of the invention. In step 2-2, a roaming subscriber, i.e. the user of a terminal MS, switches on his or her terminal and logs on to a network (attach). In step 2-4, the call is acknowledged and the network detects that the subscriber is a roam-

ing subscriber. In step 2-6, the terminal is allowed to access the network. In step 2-8, the network sends the terminal MS a provisioning message providing information necessary for using the services. In step 2-10, the terminal stores the provisioning message automatically, or the user stores manually the information included in the provisioning message. In step 2-12, the user, utilizing the information included in the provisioning message, is allowed to use the MMS services of the visited network.

It is apparent to one skilled in the art that the invention is not restricted to the embodiments shown above but, as technology advances, the basic idea of the invention can be implemented in many different ways. The invention and its embodiments are thus not restricted to the examples described above but may vary within the scope of the claims.

CLAIMS

1. A method for providing MMS services for a terminal roaming in a visited network, in which method the terminal transmits an attach request (2-2) to the network and, in response to the attach request, the network provides the terminal with network services (2-8), characterized in that

the network sends the terminal a provisioning message (2-8) including sufficient information for using the MMS services;

the terminal utilizes the information included in the provisioning message for using the MMS services (2-12).

2. A method as claimed in claim 1, characterized in that the network sends the terminal a provisioning message in response to the terminal transmitting a call setup request to a certain number reserved for transmitting the provisioning message.

3. A method as claimed in claim 1, characterized in that the network sends the terminal a provisioning message in response to the terminal transmitting an SMS, EMS or MMS message to a certain number or address reserved for transmitting the provisioning message.

4. A method as claimed in claim 1, characterized in that the network sends the terminal a provisioning message in response to the subscriber of the terminal activating an MMS service from a WAP or WWW page.

5. A method as claimed in any one of the preceding claims, characterized in that the network detects a new roaming subscriber and, according to a contract between operators, consults a user's home network in order to find out whether or not the subscriber is a subscriber to the MMS provisioning service.

6. A telecommunication network (MMSC, MDB, HLR) for producing MMS services, the telecommunication network being configured to receive an attach request from a terminal (MS), characterized in that the telecommunication network is configured to:

identify (2-4) the terminal as a roaming terminal if the subscriber of the terminal does not have a subscriber contract with the particular telecommunication network; and

in response to the terminal having been identified as a roaming terminal, send the terminal a provisioning message (2-8) including sufficient information for using the MMS services.

Fig. 1

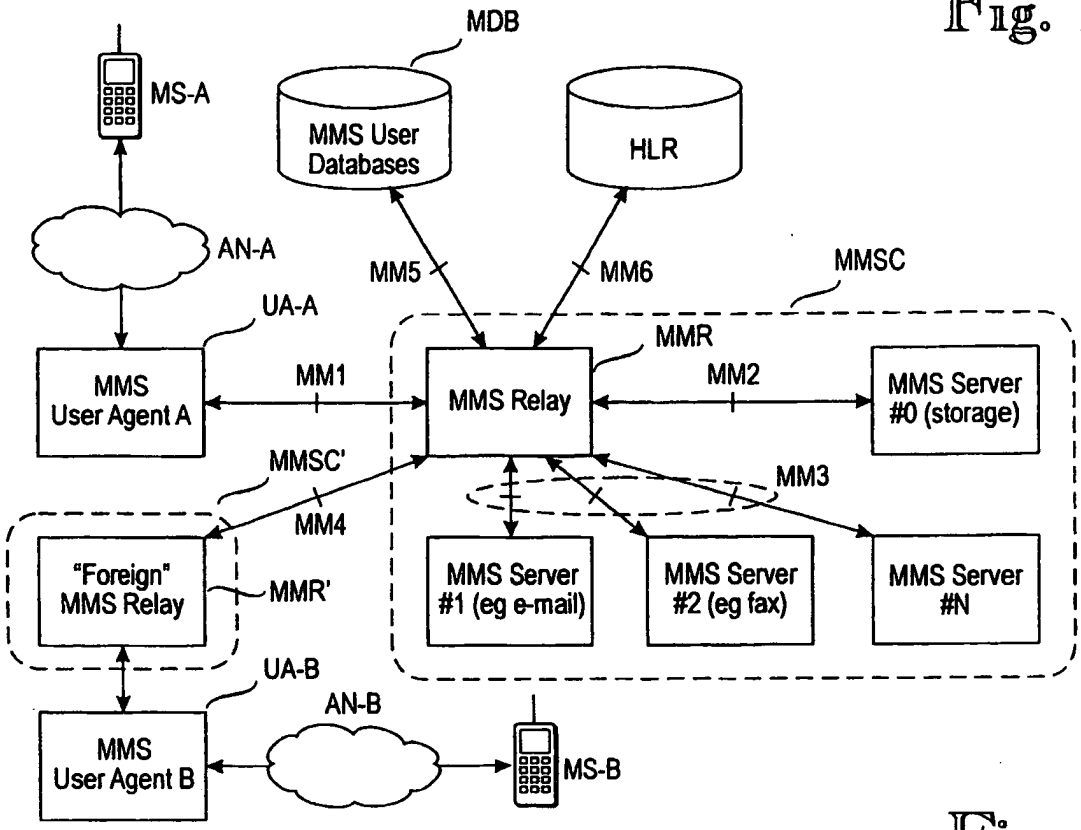
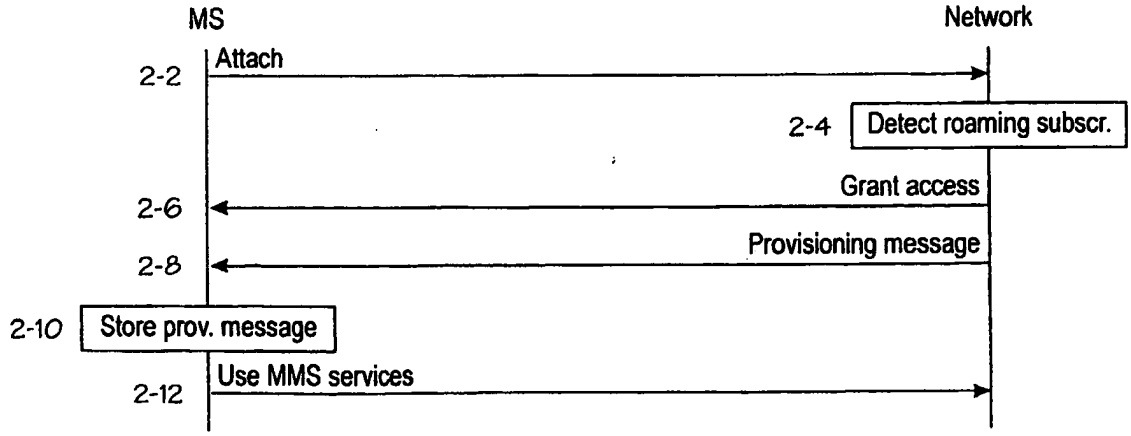

MDB
MS-A
MMS User Databases
HLR
AN-A
MM5
MM6
MMSC
UA-A
MMR
MMS User Agent A
MM1
MMS Relay
MM2
MMS Server #0 (storage)
MMSC'
MM3
MM4
"Foreign" MMS Relay
MMR'
MMS Server #1 (eg e-mail)
MMS Server #2 (eg fax)
MMS Server #N
UA-B
AN-B
MMS User Agent B
MS-B

Fig. 2


MS
Network
2-2
Attach
2-4
Detect roaming subscr.
Grant access
2-6
Provisioning message
2-8
2-10
Store prov. message
2-12
Use MMS services

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 02/00910

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/38, H04Q 7/22
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 0057610 A2 (NOKIA MOBILE PHONES LIMITED), 28 Sept 2000 (28.09.00), page 19 - page 22, abstract ---	1-6
A	3GPP TS 23.140 v4.2.0 (2001-03) 3rd Generation Partnership Project; Technical Specification Group Terminals; Multimedia Messaging Service (MMS); Functional description; Stage 2 (Release 4) --- --------	1-6

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 February 2003	13 -02- 2003
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Thomas Tholin/mj Telephone No. +46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

Information on patent family members

30/12/02

International application No.
PCT/FI 02/00910

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0057610 A2	28/09/00	AU 2237400 A	28/09/00
		AU 3450000 A	09/10/00
		BR 0009181 A	02/01/02
		CA 2301419 A	22/09/00
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		EP 1163775 A	19/12/01
		FI 107424 B	00/00/00
		FI 990640 A	23/09/00
		JP 2000324174 A	24/11/00